Bioventing Non-Petroleum Hydrocarbons

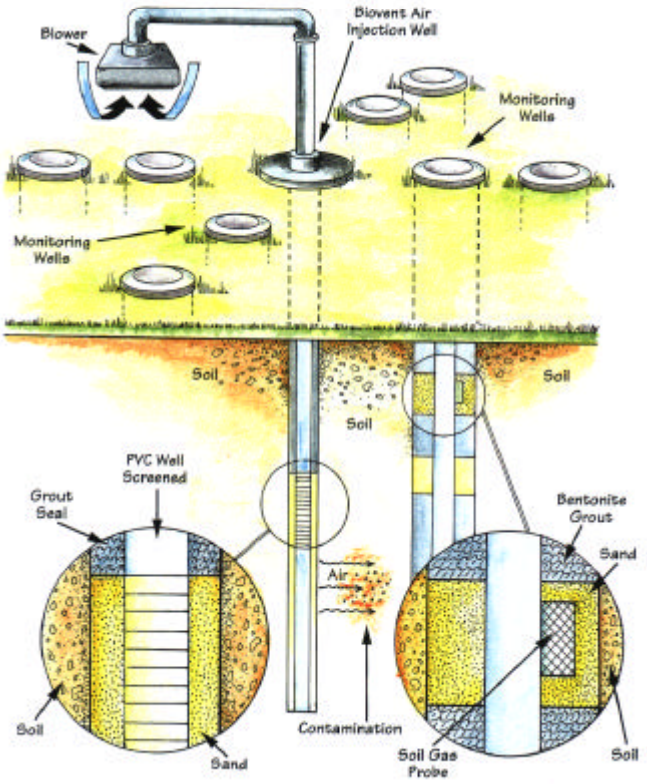
An Extension of a Successful Technology for Broader Application
US Air Force Research Laboratory (AFRL/MLQ), Tyndall AFB, Florida

BIOVENTING:

Bioventing has been proven successful in achieving in situ treatment of various types of hydrocarbon contamination. The technology has been employed to remediate sites contaminated with gasoline, diesel fuel, and JP-4 and JP-5 aviation fuels.

THE NEED:

Research was conducted to examine the effectiveness of bioventing for treating non-fuel hydrocarbons which can be directly metabolized (*e.g.*, acetone, chlorobenzenes, and PAHs), as well as compounds which are degraded cometabolically. AFRL/MLQ demonstrated bioventing for a broader list of potential contaminants. The objective of this pilot demonstration was to design, install, operate, and monitor a bioventing system on a site contaminated with chlorobenzene, dichlorobenzene, methylene chloride, and/or acetone.

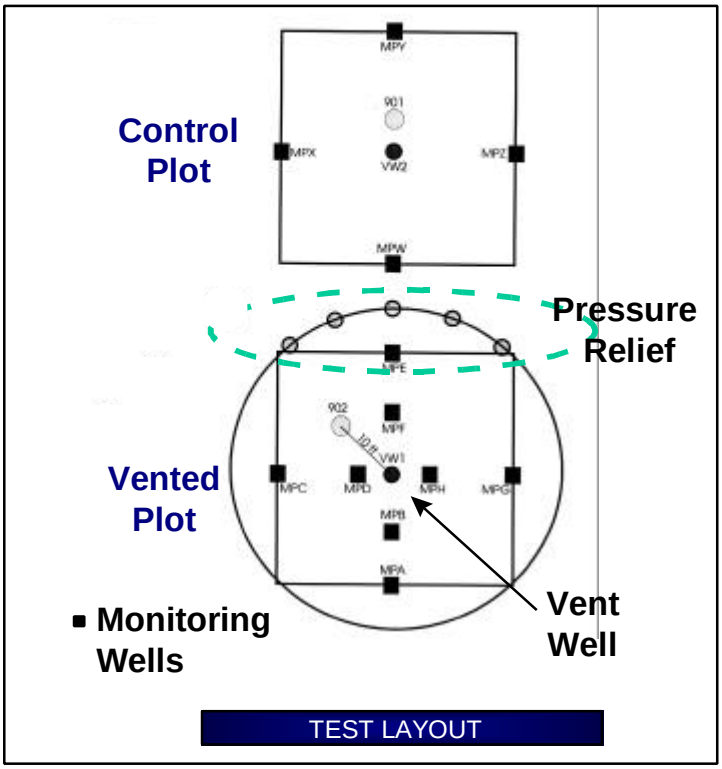


THE SITE:

The demonstration site selected was a former chemical disposal area at Hill AFB, Utah. Previous site characterization revealed chlorobenzene, dichlorobenzene, and other organic contaminants. A survey was conducted for precise location of the demonstration experiment.

THE EXPERIMENT:

The test equipment consisted of a single vent well and eight monitoring wells to detect, monitor, and characterize the biological remediation. A 0.5 hp blower was used to pump air into the ground. The vent was screened from 4 to 17 feet BGS. Each soil gas monitoring point included three soil gas-sampling probes, temperature sensors, and an oxygen sensor. An unvented pattern of wells served as a control.



MONITORING:

Soil gas was analyzed for O_2, CO_2, and TPH concentrations. Airflow was adjusted to achieve $\geq$ 10% O_2. System parameters include temperature, manifold pressure, airflow rate, and microbial respiration. In situ respiration tests to monitor system performance were performed quarterly during the 12 months of operation. A surface emission test was performed to ensure that contaminant is not being released to the atmosphere. The overall effectiveness of the system was determined, based on the reduction in the mass of chlorobenzenes and other contaminants within the soil volume influenced by the bioventing system. Results from the effort will be available from AFRL/MLQE in February 1999.

RETURN ON INVESTMENT:

Bioventing has the potential to achieve remediation at one-third the cost of removal and decontamination above ground. Additionally, bioventing produces no hazardous waste for disposal.

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